CLAIMS

1. A curable resin composition,

which contains an epoxy resin, a solid polymer having a functional group to react with an epoxy group and a curing agent for an epoxy resin, no phase separation structure being observed in a matrix of a resin when a cured product is dyed with a heavy metal and observed with a transmission electron microscope.

2. The curable resin composition according to claim 1,

wherein the cured product has a single tanδ peak in viscoelasticity spectrometry and the temperature of the peak is 120°C or higher.

3. The curable resin composition according to claim 1 or 2,

wherein the cured product has a swelling ratio of 50% or less measured in a dimethyl sulfoxide solution heated at 120°C.

4. The curable resin composition according to claim 1, 2 or 3,

wherein extracted water obtained by extracting an eluting component of the cured product with hot water at 110°C has pH not lower than 5.0 and lower than 8.5.

5. The curable resin composition according to claim 1, 2, 3 or 4,

wherein extracted water obtained by extracting an eluting component of the cured product with hot water at 110°C has an electric conductivity of 100 μS/cm or lower.

6. The curable resin composition according to claim

1, 2, 3, 4 or 5,

wherein the cured product has a dielectric constant of 3.5 or lower and a dielectric loss tangent of 0.02 or lower.

7. The curable resin composition according to claim 1, 2, 3, 4, 5 or 6,

wherein the epoxy resin is an epoxy resin having a polycyclic hydrocarbon skeleton in the main chain and the solid polymer having the functional group to react with the epoxy group is a high molecular polymer having an epoxy group and no inorganic filler is contained.

8. The curable resin composition according to claim 7,

wherein the epoxy resin having a polycyclic hydrocarbon skeleton in the main chain is an epoxy resin having a dicyclopentadiene skeleton or an epoxy resin having a naphthalene skeleton.

9. The curable resin composition according to claim 7 or 8,

wherein the high molecular polymer having an epoxy group has a weight-average molecular weight (Mw) of 10,000 or higher.

10. The curable resin composition according to claim 7, 8 or 9,

wherein the high molecular polymer having an epoxy group has an epoxy equivalent of 200 to 1,000.

11. The curable resin composition according to claim 7, 8, 9 or 10,

wherein the high molecular polymer having an epoxy group is produced by suspension polymerization method.

12. The curable resin composition according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11,

which further contains a low elastic modulus substance having elastic modulus (G') in a range of 1×10^5 to 1×10^8 Pa at 20°C, the low elastic modulus substance being dispersed like an island in non-compatible state with the epoxy resin and the solid polymer having the functional group to react with the epoxy group.

13. A curable resin composition,

which contains an epoxy resin composition obtainable by mixing an epoxy resin having a dicyclopentadiene skeleton, an epoxy resin having a naphthalene skeleton and a curing agent for an epoxy resin, and rubber particles having a core-shell structure, the core having a glass transition temperature of 20°C or lower and the shell having a glass transition temperature of 40°C or higher.

14. An adhesive epoxy resin paste,

which comprises the curable resin composition according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13.

15. An interlayer adhesive,

which comprises the adhesive epoxy resin paste according to claim 14.

16. A non-conductive paste,

which comprises the adhesive epoxy resin paste according to claim 14.

17. An underfill,

which comprises the adhesive epoxy resin paste according to claim 14.

18. An adhesive epoxy resin sheet,
which is obtainable by forming the curable resin composition according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13 in a sheet form.

19. The adhesive epoxy resin sheet according to claim 18,
wherein a heat-cured product obtained by heat curing at a temperature rising rate of 45°C/min has a storage modulus (G') exceeding 1×10^3 Pa.

20. The adhesive epoxy resin sheet according to claim 18 or 19,
wherein the peak temperature of tanδ based on dynamic viscoelasticity is in a range of -20°C to 40°C before curing and 120°C or higher after curing.

21. A non-conductive film,
which comprises the adhesive epoxy resin sheet according to claim 18, 19 or 20.

22. A die attach film,
which comprises the adhesive epoxy resin sheet according to claim 18, 19 or 20.

23. A conductive connection paste,
wherein conductive fine particles are contained in the adhesive epoxy resin paste according to claim 14.

24. An anisotropic conductive paste,
which comprises the conductive connection paste according to claim 23.

25. A conductive connection sheet,

which comprises the adhesive epoxy resin sheet according to claim 18, 19 or 20 and conductive fine particles, at least a part of the conductive fine particles being exposed out of the adhesive epoxy resin sheet.

26. A conductive connection sheet,

which is obtainable by embedding conductive fine particles smaller than the thickness of the adhesive epoxy resin sheet in the adhesive epoxy resin sheet according to claim 18, 19 or 20.

27. An anisotropic conductive film,

which comprises the conductive connection sheet according to claim 26.

28. A conductive connection sheet,

which is formed by a pressure sensitive adhesive resin sheet comprising a pressure sensitive resin composition containing a resin provided with a pressure sensitive adhesive property by addition of a plasticizer and an epoxy resin having a naphthalene skeleton in liquid phase at normal temperature and conductive fine particles, the pressure sensitive adhesive resin sheet having a peak temperature of tanδ based on dynamic viscoelasticity in a range of -20°C to 40°C before curing and 120°C or higher after curing and the conductive fine particles being arranged at any positions of the pressure sensitive adhesive resin sheet and at least a part of the conductive fine particles being exposed out of the pressure sensitive adhesive resin sheet.

29. The conductive connection sheet according to claim 28,

wherein the pressure sensitive adhesive resin sheet after curing has an elongation percentage of 5% or lower

after a pressure cooker test carried out under conditions of a temperature of 120°C and a humidity of 85% RH for 12 hours.

30. A flip chip tape,

which comprises a conductive connection sheet according to claim 25, 28 or 29.

31. An electronic component joined body,

which is obtainable by joining a bump-shaped projected electrode of an electronic part to another electrode in electrically connected state by any of the curable resin composition according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13, the adhesive epoxy resin paste according to claim 14, the interlayer adhesive according to claim 15, the non-conductive paste according to claim 16, the underfill according to claim 17, the conductive connection paste according to claim 23, the anisotropic conductive paste according to claim 24, the adhesive epoxy resin sheet according to claim 18, 19 or 20, a non-conductive film according to claim 21, the die attach film according to claim 22, the conductive connection sheet according to claim 25, 26, 28 or 29, the anisotropic conductive film according to claim 27 and the flip chip tape according to claim 30.

32. An electronic component joined body,

which is obtainable by joining at least one kind circuit substrate selected from a group consisting of a metal lead frame, a ceramic substrate, a resin substrate, a silicon substrate, a compound semiconductor substrate, and a glass substrate by any of the curable resin composition according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or 13, the adhesive epoxy resin paste according to claim 14, the interlayer adhesive according to claim 15, the non-

conductive paste according to claim 16, the underfill according to claim 17, the conductive connection paste according to claim 23, the anisotropic conductive paste according to claim 24, the adhesive epoxy resin sheet according to claim 18, 19 or 20, a non-conductive film according to claim 21, the die attach film according to claim 22, the conductive connection sheet according to claim 25, 26, 28 or 29, the anisotropic conductive film according to claim 27 and the flip chip tape according to claim 30.

33. The electronic component joined body according to claim 32,

wherein the resin substrate is a glass epoxy substrate, a bismaleimidetriazine substrate or a polyimide substrate.